

Research Project

Studies in the Molecular Sciences Enabled by High Sensitivity NMR

Third-party funded project

Project title Studies in the Molecular Sciences Enabled by High Sensitivity NMR

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Organisation / Research unit

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Department

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Over the last decades, NMR spectroscopy has dramatically changed research in the molecular sciences. The frontiers of NMR spectroscopy are pushed forward by new developments in instrumentation, among others. In particular, new instruments have become available that drastically increase the sensitivity with regard to sample limited scientific problems, or for ^{19}F spectroscopy of e.g. complex biomolecules or nanoparticles. This R'Equip project proposal requests the purchase of a 600 MHz NMR spectrometer, equipped with a cryoplatfrom and two cryoprobes, a 1.7 mm TCI cyroprobe and a 5 mm QCI-F quadruple cryoprobe for fluorine applications. The requested NMR spectrometer will facilitate research in two major directions: (1) research questions where only a limited amount of sample is available and (2) studies that require a high amount of ^{19}F sensitivity. For the first research area, the requested instrument enables full structural characterization of small molecules on the nanogram scale. For the second line of investigation, the requested instrument allows to cut measurement time by a factor of 80-100, with an identical signal to noise ratio. Therefore, this significant increase in sensitivity will allow addressing problems that have so far escaped scientific research. üüü üThe requested instrument will enable research in a variety of scientific disciplines, such as chemistry, chemical biology, pharmacy, pharmacology, molecular toxicology, biochemistry, enzymology, structural biology and nanoscience, among others. Six research groups from several departments at the University of Basel (Chemistry, Biozentrum, Pharmaceutical Science, Swiss Center of Applied Human Toxicology and the Swiss Nanoscience Institute) take part in this application, underlining the broad usage potential of the requested instrument by many disciplines in the molecular sciences. It is envisioned that other research groups from Switzerland from the above disciplines and beyond will utilize this instrument as well. Over the last decades, NMR spectroscopy has dramatically changed research in the molecular sciences. The frontiers of NMR spectroscopy are pushed forward by new developments in instrumentation, among others. In particular, new instruments have become available that drastically increase the sensitivity with regard to sample limited scientific problems, or for ^{19}F spectroscopy of e.g. complex biomolecules or nanoparticles. This R'Equip project proposal requests the purchase of a 600 MHz NMR spectrometer, equipped with a cryoplatfrom and two cryoprobes, a 1.7 mm TCI cyroprobe and a 5 mm QCI-F quadruple cryoprobe for fluorine applications.ä The requested NMR spectrometer will facilitate research in two major directions: (1) research questions where only a limited amount of sample is available and (2) studies that require a high amount of ^{19}F sensitivity. For the first research area, the requested instrument enables full structural characterization of small molecules on the nanogram scale. For the second line of investigation, the requested instrument allows to cut measurement time by a factor of 80-100, with an identical signal to noise ratio. Therefore,

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